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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,170	12/28/2001	Naokatsu Ikegami	OKI.153D	6458

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EXAMINER
CHEN, KIN CHAN

ART UNIT	PAPER NUMBER
1765	4

DATE MAILED: 05/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/029,170	IKEGAMI, NAOKATSU	
	Examiner	Art Unit	
	Kin-Chan Chen	1765	

-- Th MAILING DATE of this communication app ars on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 12-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 12-17 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/519,575 .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watatani (US 6,153,511) in view of Kikuchi et al. (US 5,226,056; hereinafter "Kikuchi") or Hopper et al. (US 6,030,901; hereinafter "Hopper")

Watatani teaches that the contact holes may be formed in an insulating film composed of an organic insulating layer (or SOG) using a patterned resist layer formed over the organic insulating layer as a mask. The patterned resist layer may be ashed by a plasma treatment (col. 7, lines 4-11).

Unlike the claimed invention, Watatani does not disclose that the plasma for removing the resist pattern may contain nitrogen and hydrogen. In a method for plasma ashing a resist film, Kikuchi (col. 1, lines 45-55) or Hopper (col. 4, lines 54) teaches that the plasma for removing the resist pattern on a substrate may contain hydrogen, and nitrogen. Hence, It would have been obvious to one skilled in the art at the time of

invention to modify Watatani by using said plasma of Kikuchi or Hopper in order to effectively remove the resist during the semiconductor device fabrication.

The claimed invention differs from the combined prior art by specifying the protective film is formed by reacting the organic SOG insulating layer with the nitrogen. However, same plasma is used in the same process of etching the organic SOG insulating layer, it would naturally form the protective film as claimed accordingly.

Dependent claim 15 differs from the prior art by specifying well-known feature (such as adding an alkyl group to a silicon oxide to obtain SOG) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify the combined prior art by adding same well-known feature to same in order to provide their art recognized advantages and produce an expected result.

3. Claims 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over You et al. (US 6,235,453; hereinafter "You") in view of Watatani (US 6,153,511).

You teaches that the contact holes may be formed in an insulating film composed of an organic insulating layer (or SOG) using a patterned resist layer formed over the organic insulating layer as a mask. The patterned resist layer may be ashed by a plasma treatment. You teaches that the plasma for removing the resist pattern on a substrate may contain hydrogen, and nitrogen and form a protective layer. See col.3, lines 3-8, 42-46; col. 4. You is not particular about SOG in the process. Hence, It would

have been obvious to one skilled in the art to use organic SOG because it is one of the most popular SOG in the art of semiconductor device fabrication. Watatani is relied on to show this conventional material of organic SOG (col. 7, lines 7-10). Because it is a conventional material and because it is disclosed by Watatani, hence, it would have been obvious to one with ordinary skill in the art to use it in the process of you in order to provide their art recognized advantages and produce an expected result.

The claimed invention differs from the combined prior art by specifying the protective film is formed by reacting the organic SOG insulating layer with the nitrogen. However, same plasma is used in the same process of etching the organic SOG insulating layer, it would naturally form the protective film as claimed accordingly.

Dependent claim 15 differs from the prior art by specifying well-known feature (such as adding an alkyl group to a silicon oxide to obtain SOG) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify the combined prior art by adding same well-known feature to same in order to provide their art recognized advantages and produce an expected result.

4. Claims 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watatani in view of Huffman et al. (US 6,082,374; hereinafter "Huffman").

Watatani teaches that the contact holes may be formed in an insulating film composed of an organic insulating layer (or SOG) using a patterned resist layer formed

over the organic insulating layer as a mask. The patterned resist layer may be ashed by a plasma treatment (col. 7, lines 4-11).

Unlike the claimed invention, Watatani does not disclose that the plasma for removing the resist pattern may contain nitrogen and hydrogen, nor does Watatani teach using $O_2 + N_2H_2$ as a plasma to strip photoresist. In a method of removing photoresist, Huffman teaches that sources of N_2 containing compound and H_2 containing compound other than N_2 and H_2 may also be used for stripping resist (col. 5, lines 60-63). Huffman teaches using N_2/H_2 or $O_2 + N_2H_2$ as a plasma to strip photoresist (col. 12 and 15). Hence, it would have been obvious to one with ordinary skill in the art to use $O_2 + N_2H_2$ as a plasma to strip photoresist because Huffman show the equivalence among sources of N_2 containing compound and H_2 containing compound for stripping the photoresist.

The claimed invention differs from the combined prior art by specifying the protective film is formed by reacting the organic SOG insulating layer with the nitrogen. However, same plasma is used in the same process of etching the organic SOG insulating layer, it would naturally form the protective film as claimed accordingly.

Dependent claim 15 differs from the prior art by specifying well-known feature (such as adding an alkyl group to a silicon oxide to obtain SOG) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify the combined prior art by adding same well-known feature to same in order to provide their art recognized advantages and produce an expected result.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.

K-C C
April 29, 2003

Patent Examiner
Group Art Unit 1765